Unsafe abortion

Global and regional estimates of the incidence of unsafe abortion and associated mortality in 2003

5 Fifth edition

World Health Organization

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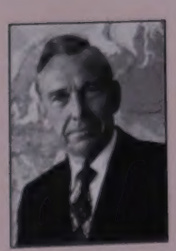
Preface

Unsafe abortion continues to be a major public health problem in many countries. A woman dies every eighth minute somewhere in a developing country due to complications arising from unsafe abortion. She was likely to have had little or no money to procure safe services, was young – perhaps in her teens – living in rural areas and had little social support to deal with her unplanned pregnancy. She might have been raped or she might have experienced an accidental pregnancy due to the failure of the contraceptive method she was using or the incorrect or inconsistent way she used it. She probably first attempted to self-induce the termination and after that failed, she turned to an unskilled, but relatively inexpensive, provider. This is a real life story of so many women in developing countries in spite of the major advancements in technologies and in public health.

The Safe Motherhood Conference held in 1987 in Nairobi drew the world's attention to the shocking fact that over half a million women die needlessly due to complications related to pregnancy and childbirth. One of the most easily preventable causes of maternal death and ill-health is unsafe abortion, which causes approximately 13% of all maternal deaths and approximately 20% of the overall burden of maternal death and long-term sexual and reproductive ill-health.

Twenty years after the Nairobi Conference, we find that unsafe abortion is a continuing pandemic: every year nearly 42 million women faced with an unplanned pregnancy decide to have an abortion, and about 20 million of them are forced to resort to unsafe abortion. These approximately 20 million women often self-induce abortions or obtain a clandestine and unsafe abortion carried out by untrained persons under poor hygienic conditions. Abortion induced by a skilled provider in situations where it is legal is one of the safest procedures in contemporary medical practice and the recourse to manual vacuum aspiration (MVA) and medical (non-surgical) abortion have reduced abortion-related complications to very low levels.

The interventions to prevent unsafe abortion include expanding access to modern contraceptive services, providing safe abortion to the full extent of the law, and tackling the legal and programmatic barriers to the access to safe abortion. An informed and objective discourse continues to be much needed for developing interventions to prevent unsafe abortion and its devastating consequences for the survival, health and well-being of women, families and societies. By providing an objective assessment of the incidence of unsafe abortion and its related mortality, this report goes a long way in raising awareness of this major, but often neglected, public health problem. It provides the basis for informed discussion and implementing the much required interventions to reduce and, eventually, eliminate unsafe abortion. I commend the World Health Organization for issuing this report.



Halfdan Mahler
Director-General Emeritus, WHO
Director-General, WHO: 1973-1988
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25 September 2007

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Abstract

This report gives estimates of the number of unsafe abortions and associated mortality for the year 2003. Nearly 20 million unsafe abortions took place that year, 98% of them in developing countries with restrictive abortion laws. These countries often also have low rates of use of modern reversible contraceptives and high levels of unmet need for family planning. Regional and global estimates of the incidence rate of unsafe abortion (per 1000 women aged 15–44 years) and unsafe abortion ratios (per 100 live births) are presented. The report identifies areas where data on unsafe abortion are particularly scarce and estimates therefore tenuous. Trends in the estimated incidence of unsafe abortion are examined, and relevant background information is provided on the legal context of abortion, fertility transition, unplanned pregnancy, family planning and contraceptive method mix. The health consequences of unsafe abortion and their global burden for women and for society are discussed. This is the fifth update of this document since the first edition was published by WHO in 1990.

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1. Introduction

Methhods to terminate an unwanted or unintended pregnancy are known to have existed since ancient times. As far back as 5000 years ago, the Chinese Emperor Shen Nung described the use of mercury for inducing abortion.[1] A recent publication[2] lists over 100 traditional methods of inducing abortion, which can be broadly classified into four categories: (1) oral and injectable medicines; (2) vaginal preparations; (3) introduction of a foreign body into the uterus; and (4) trauma to the abdomen. Many of these methods pose serious threats to the woman's life and well-being.

Each year, throughout the world, approximately 210 million women become pregnant[2] and some 130 million[3] of them go on to deliver live-born infants. The remaining 80 million pregnancies[2] end in stillbirth, or spontaneous or induced abortion. Approximately 42 million[4] pregnancies are voluntarily terminated each year – 22 million within the national legal system and 20 million outside it. In the latter case, the abortions are often performed by unskilled providers or in unhygienic conditions, or both.

Only one in three legal (and mostly safe) abortions take place in developing countries (excluding China),[4] while 98% of unsafe abortions occur there. Over five million or approximately 1 in 4 women having an unsafe abortion is likely to face severe complications, which can cause death, and will seek hospital care, putting heavy demand on scarce resources.[5] Unsafe abortion nonetheless remains a neglected health care problem in developing countries. Unsafe abortion is characterized by the inadequacy of the provider's skills and use of hazardous techniques and unsanitary facilities. Women who resort to clandestine facilities or unqualified providers put their health and life at risk.

The World Health Organization (WHO) is concerned with the public health aspects of unsafe abortion. As early as 1967, the World Health Assembly passed Resolution WHA20.41, which stated that "abortions ... constitute a serious public health problem in many countries", and requested the Director-General to "continue to develop the activities of the World Health Organization in the field of health aspects of human reproduction". WHO defines unsafe abortion as a procedure for terminating an unintended pregnancy carried out either by persons lacking the necessary skills or in an environment that does not conform to minimal medical standards, or both.[6]

The consensus statement of the 1994 International Conference on Population and Development (ICPD) noted that "All Governments and relevant intergovernmental and non-governmental organizations are urged to strengthen their commitment to women's health, to deal with the health aspect of unsafe abortion as a major public health concern and to reduce the recourse to abortion through expanded and improved family-planning services."[7]

The above was reiterated in 1999 at the five-year review of the implementation of the ICPD Programme of Action by the UN General Assembly in New York, USA.[8] The Assembly further agreed that, "in circumstances where abortion is not against the law, health systems should train and equip health-service providers and should take other measures to ensure that such abortion is safe and accessible."[8]

In spite of these calls for action, and a rise in contraceptive use globally, unsafe abortion continues to be common, especially in developing countries. This report provides estimates of the number of unsafe abortions and their associated mortality for the year 2003. It presents the corresponding regional and global rates and ratios, which show the severity of the problem and allow comparison across geographical regions. It also identifies "blank zones", where data are particularly scarce and estimates are generally illustrative. The report also examines trends in the incidence of unsafe abortion over time and notes the regions where safe abortions have become more accessible. Relevant background information is provided on the legal framework of abortion, fertility transition, unplanned pregnancy, family planning and contraceptive method mix. The health consequences of unsafe abortion and their global burden for women and for society are also discussed. This is the fifth update since the first edition was published by WHO in 1990.[9]

2. Legal framework of abortion

The incidence of unsafe abortion is influenced by the legal provisions governing access to safe abortion, as well as the availability and quality of legal abortion services. Restrictive legislation is associated with a high incidence of unsafe abortion.[10, 11]

The conditions under which abortion is legally permitted are different in different countries (Table 1). In some countries, access is highly restricted; in others, pregnancy termination is available on broad medical and social grounds or on request. Note that the conditions are usually additive; i.e. when abortion is permitted for a more liberal condition, it is generally also permitted for the more restrictive conditions. For example, if abortion is permitted to preserve mental health, it is generally also permitted to save the woman's life. Abortion laws are diverse and can be complex. There may be discrepancies between the wording of the law (*de jure*) and its application (*de facto*), which means that common practice can help or hinder the procurement of legal abortion. Even where it is legally permitted, safe abortion may not be easily accessible; there may be additional requirements regarding consent and counselling, and countries often impose a limit on the period during which abortion may be performed. In addition, the attitudes of medical staff may be discouraging, and abortion services may be insufficient to meet the demand, unevenly distributed or of poor quality. Finally, women themselves may be unaware of the availability of abortion services or their right to access them within the legal framework.

Table 1. Grounds on which abortion is legally permitted in 193 countries, 2001

	To save the woman's life	To preserve physical health	To preserve mental health	Rape or incest	Fetal impair-ment	Economic or social reasons	On request
All countries (n = 193)							
Permitted	189	122	120	83	76	63	52
Not permitted	4	71	73	110	117	130	141
Developed countries (n = 48)							
Permitted	46	42	41	39	39	36	31
Not permitted	2	6	7	9	9	12	17
Developing countries (n = 145)							
Permitted	143	80	79	44	37	27	21
Not permitted	2	65	66	101	108	118	124

Source: United Nations[12]

3. Fertility transition and unplanned pregnancy

It has been estimated that almost 40% of pregnancies worldwide are unplanned[2] – the result of non-use of contraception, ineffective contraceptive use or method failure. Unintended pregnancy, and induced abortion, can be prevented and reduced by expanding and improving family planning services and choices, reaching out to communities and underserved population groups, for example sexually active teenagers and unmarried women.

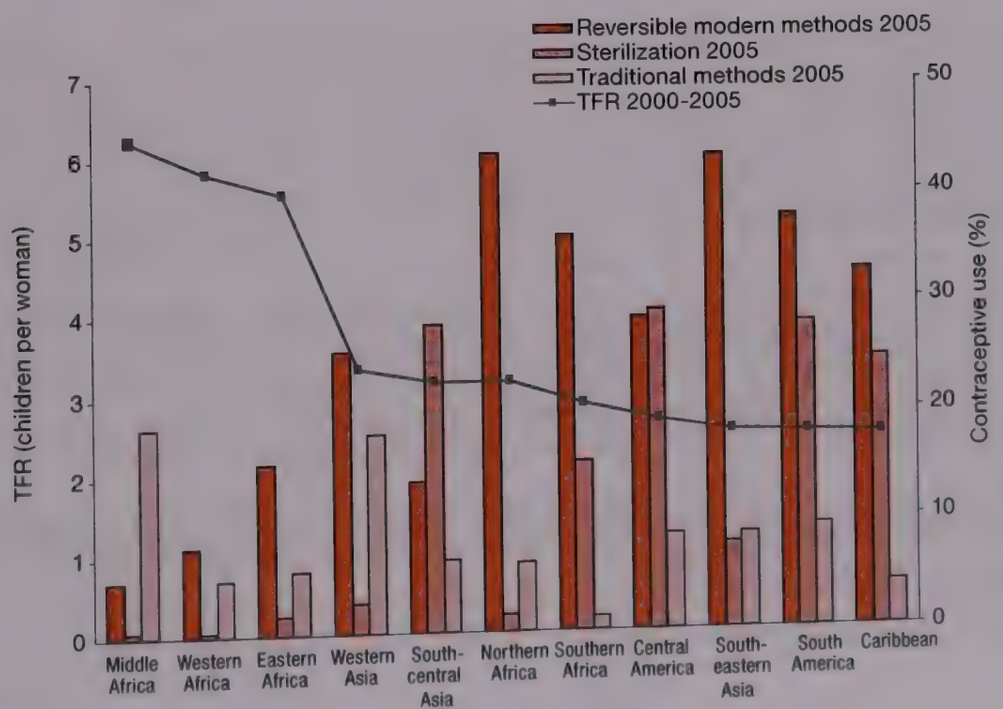
When people are motivated to regulate their fertility, but effective contraception is largely inaccessible or not consistently or correctly used, a large number of unplanned pregnancies occur. Many married women in developing countries do not have access to the contraceptive methods of their choice.[13,14,15,16] The situation is even more difficult for unmarried women, particularly adolescents, who rarely have access to information and counselling on sexual and reproductive health, and are frequently excluded from contraceptive services. An estimated 123 million women have an unmet need for family planning.[17] During rapid transition from high to low fertility, as has

been witnessed in several countries, contraceptive services are often unable to meet the growing demand of couples for fertility regulation,[18] resulting in an increased number of unplanned pregnancies, some of which are terminated by induced abortion. Also, where less effective family planning methods are commonly used, unplanned pregnancies and, consequently, abortions are likely to occur. Of course, no contraceptive method is 100% effective. It is estimated that each year 27 million unintended pregnancies occur as a result of method failure or ineffective use; of these, about 6 million occur even though the contraceptive method has been used correctly and consistently.[19]

Application of statistical models shows that an increase in contraceptive prevalence and in use of effective contraceptive methods will reduce the incidence of abortion.[20] The validity of this model was recently demonstrated using data from developed countries.[21] The latter study also showed that, when fertility starts to decline, both abortion and contraceptive use can rise simultaneously. The authors' explanation for this is that contraceptive use alone is unable to meet the growing demand for fertility regulation. As early as 1962, these trends were observed in Santiago, Chile.[22] Current estimates of unsafe abortion and contraceptive use by fertility level in developing countries show similar trends. An aggregated analysis of the association between use of contraception and unsafe abortion by region indicates that women may resort to unsafe abortion to space births before terminating childbearing through sterilization.[23] (Sterilization is the most common modern contraceptive method in some parts of the world, such as Latin America and South-central Asia.[24]) It is therefore essential, not only to make family planning available, but also to offer an appropriate choice of contraceptive methods to meet the individual needs to space or limit births.

Figure 1 shows the composition of contraceptive method use in regions of the developing world, relative to total fertility rate (TFR), i.e. the average number of children per woman by the end of her reproductive years.

Figure 1. Total fertility rate (TFR) and percentage of women using a contraceptive method, by type of method and region, around 2005



Source: United Nations[3, 24]

4. Abortion attempts

Each year, an estimated 80 million women have an unplanned pregnancy. Some of these women will decide to continue the pregnancy, while others will consider having an abortion. A number of women who attempt to have an abortion will not be successful, and will carry the unwanted pregnancy to term. The number of women who attempt an unsafe abortion, risking their life and health, is 20–25% higher than the number who succeed. In addition, some women may make repeated attempts to terminate a pregnancy before succeeding, each time risking their health.

A recent survey of 2400 women in Madhya Pradesh, India,[25] found that 32% of women aged 35–39 years had attempted abortion at some time, and 23% had had an

abortion, indicating that roughly one in four women who attempted abortion did not succeed. Self-reported morbidity was higher in rural areas (57%) than in urban areas (45%). Severe complications were also more common in rural areas (35% vs. 16%), showing that higher risks are associated with abortions in underserved rural areas. Not unexpectedly, only 9% of the women knew that abortion was legal, 49% thought that abortion was illegal, and 36% did not know its legal status; the remaining 6% reported knowing that abortion was legal, but their knowledge of the period within which it was legal was incorrect.

In Pakistan, of 1214 women interviewed, 100 (8.2%) reported seeking an abortion to terminate an unplanned pregnancy at least once; 89 of these women were successful.[26] In Teheran, Islamic Republic of Iran, 38% of 6394 pregnant women reported that the pregnancy was unwanted; 12% of these (297) resorted to abortion.[27] Some women make several unsafe attempts to end an unintended pregnancy, even where medical services are available. For example, although menstrual regulation (MR) is available in Bangladesh, a comprehensive study in 1996–97 showed that only 40% of 143 women seeking abortion-related care had turned first to health facilities; others had seen two or three untrained providers. Four of the women had to be referred to the district hospital with serious complications, and one died. The untrained practitioners included traditional birth attendants, homoeopaths, herbalists, religious healers, village doctors and relatives.[28]

Many abortions are self-induced: in Cambodia, where abortion is legally available on request, women often attempt to abort themselves before turning to hospital.[29] In a study in health facilities in Nigeria, it was found that 30% of women seeking abortion care had first attempted to stop the pregnancy themselves, or had turned to an untrained person.[30] A recent survey of over 3000 women aged 15–49 years in eight states in Nigeria found that 28% had had at least one unwanted pregnancy; 58% of these had tried to terminate a pregnancy, and 84% of women who attempted had succeeded.[31] In another study of 1516 women aged 15–44 years in Jos and Ife (Nigeria), 20% reported having had an unwanted pregnancy; 58% of them stated that they had terminated the pregnancy, whereas 9% had failed; the remaining women had not taken any action.[32] In a survey of 999 women in Bamako, Mali, 122 of 144 women who reported having attempted an abortion had succeeded.[33] In rural villages in Mali, 28% of women surveyed reported having had an undesired pregnancy; 19% had attempted an abortion, but fewer than half of them were successful.[33]

Where almost all abortions are legal, overall success rates reflect this, e.g. the 1998 Reproductive Health Survey[34] in Mongolia reported that, among the 64% of women who had attempted to stop an unplanned pregnancy, only 2–3% had failed.

5. Health consequences of unsafe abortion and impact on health services

When induced abortion is performed by qualified persons using correct techniques and in sanitary conditions, it is a safe surgical procedure. In the USA, for example, the death rate from induced abortion is now 0.6 per 100 000 procedures, making it as safe as an injection of penicillin.[35] In developing countries, however, the risk of death following unsafe abortion may be several hundred times higher. Spontaneous abortion is rarely fatal and seldom presents complications.

The mortality and morbidity risks associated with unsafe induced abortion depend on the facilities and the skill of the abortion provider, the method used, the general health of the woman and the stage of her pregnancy. Unsafe abortion may be induced by the woman herself, by a non-medical person or by a health worker under unhygienic conditions. Abortion attempts may involve insertion of a solid object (root, twig or catheter) into the uterus; a dilatation and curettage procedure performed improperly by an unskilled provider; ingestion of harmful substances; exertion of external force; or misuse of modern pharmaceuticals. In many settings, traditional practitioners vigorously pummel the woman's lower abdomen to disrupt the pregnancy; this can cause the uterus to burst, killing the woman.[36]

The outcome of complications of unsafe abortion depends not only on the availability and quality of post-abortion care, but also on women's willingness to turn to medical services, and the readiness of medical staff to deal promptly with the complications. The cases of incomplete abortion, post-abortion sepsis, haemorrhage and genital trauma that reach hospital, and the abortion deaths, are the visible consequences of restrictive legal codes.[10,37] For every identified hospital case, there are many other women who have had an unsafe abortion, but who do not seek medical care,[38-45] either because they do not have sufficiently worrying complications or because they fear abuse, ill-treatment or legal reprisals.

One recent study estimated that every year in developing countries five million women are admitted to hospital as a result of unsafe abortion.[5] The treatment of abortion complications in hospital consumes a significant share of resources, including hospital beds, blood supply, medications, and often operating theatres, anaesthesia and medical specialists. Thus, the consequences of unsafe abortion place great demands on the scarce clinical, material and financial resources of hospitals in many developing countries,[46] undoubtedly compromising other maternity and emergency services.[47,48,49] Major physiological, financial and emotional costs are also incurred by the women who undergo unsafe abortion.[11]

A review of the combined impact of mortality and morbidity due to unsafe abortion estimated that, every year, there are 65 000 to 70 000 deaths and close to five million women with temporary or permanent disability due to unsafe abortion.[50] Of these, more than 3 million suffer from the effects of reproductive tract infection (RTI), and almost 1.7 million will develop secondary infertility. Unsafe abortion accounts for 13% of maternal deaths, and 20 % of the total mortality and disability burden due to pregnancy and childbirth, in terms of disability-adjusted life years (DALYs).[a,51] Altogether some 24 million women currently suffer secondary infertility caused by an unsafe abortion.

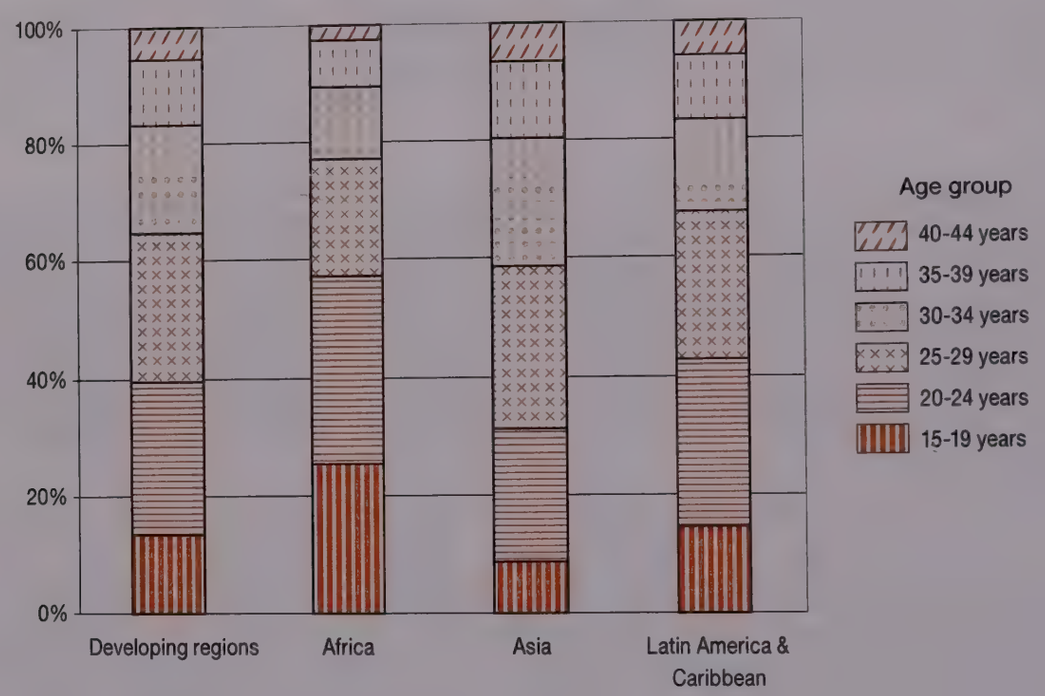
In DALYs, the combined burden of mortality and morbidity per 1000 unsafe abortions is exceptionally high in sub-Saharan Africa, where it is 50 percentage points higher than in Asia and 6 times greater than in Latin America.

The age pattern of unsafe abortion is critical to a better understanding of the barriers to access and

[a] The DALY combines years of life lost from premature death and years of life lived with disabilities in a single indicator, allowing assessment of the total loss of health from different causes. One lost DALY can be thought of as one lost year of "healthy" life, and the burden of disease as a measurement of the gap between the current health of a population and an ideal situation where everyone in the population lives into old age in full health.

to tailoring interventions by age group. A recent review found that two-thirds of unsafe abortions occur among women aged between 15 and 30 years.[52, 53] More importantly from a public health perspective, 2.5 million, or almost 14%, of all unsafe abortions in developing countries are among women under 20 years of age. Figure 2 illustrates the age pattern of unsafe abortions, which differs markedly from region to region. The proportion of women aged 15–19 years in Africa who have had an unsafe abortion is higher than in any other region; almost 60% of unsafe abortions in Africa are among women aged less than 25 years and almost 80% are among women below 30. This contrasts with Asia, where 30% of unsafe abortions are in women under 25 and 60% are in women under 30. In Latin America and the Caribbean, women aged 20–29 years account for more than half of all unsafe abortions, with almost 70% of unsafe abortions being carried out on women below 30, demonstrating an age pattern between those for Africa and Asia. Interventions need to be tailored according to the specific regional age pattern of unsafe abortion, though prevention of unsafe abortion at all ages should remain a high priority.

Figure 2. Percentage distribution of unsafe abortion by age-group in the different regions



6. Estimating unsafe abortion

"Abortion is not a marginal practice in the Congo. However, measuring it is difficult, because of a number of circumstances surrounding it. Censured by practically all religions and subject to particularly restrictive legislation, abortion is usually carried out clandestinely and, as a result, is not amenable to full registration." This quotation, translated from the 2005 Demographic and Health Survey (DHS) of Congo,[54] summarizes the abortion situation in much of the developing world, and points to the key problems related to estimating its extent.

Where induced abortion is restricted and largely inaccessible, or legal but difficult to obtain, little information is available on abortion practice. In such circumstances, it is difficult to quantify and classify abortion. What information is available is inevitably not completely reliable, because of legal, ethical and moral considerations that hinder reporting. Occurrence tends to be under-reported in surveys, and unreported or under-reported in hospital records. Of course, there are no records on women who do not seek post-abortion care in hospitals. Only the "tip of the iceberg" is, therefore, visible in the number of deaths and the number of women who suffer severe trauma, or who have an infection or severe blood loss and seek medical care.

Whether legal or illegal, induced abortion is generally stigmatized and frequently censured by religious teaching or ideologies. Women are often reluctant to admit to an induced abortion,

especially when it is illegal, and under-reporting occurs even where abortion is legal.[55,56,57,58] When abortions are clandestine, they may not be reported at all or may be reported as spontaneous abortion (miscarriage).[54,59,60] The language used to describe induced abortion reflects this ambivalence: terms include "induced miscarriage" (*fausse couche provoquée*),[61] "menstrual regulation", and "regulation of a delayed or suspended menstruation".[62] For example, in one study 16.6% of women admitted to an abortion; however, only 4.4% said they had terminated a pregnancy, and 12.2% reported that they had "induced menstruation".[63] It is therefore not surprising that unsafe abortion is one of the most difficult indicators to measure.

For the past 25 years, WHO has maintained a database on unsafe abortion and associated mortality, which today has over 3000 references, mainly related to developing countries, containing both quantitative and qualitative reports. Information relevant to understanding and measuring unsafe abortion covers data from hospital records and surveys, research on abortion providers, unsafe abortion methods, abortion-seeking behaviour, post-abortion care, and legal developments.

Where induced abortion is restricted or illegal, its occurrence can be estimated only indirectly, using the available incomplete information on incidence and mortality.[64] The estimation process used for this update started with the collection and in-depth review of over 600 new sources of information. These were assessed together with the existing data to ascertain the current situation with regard to abortion laws, policies and practice in the different countries. Correcting for misreporting and under-reporting, as described in Annex 1, unsafe abortion rates were generated first by country, and then aggregated by region and globally.

Abortion-related mortality occurs mainly as a result of unsafe abortion, since spontaneous abortion only rarely causes death. Commencing with abortion deaths as a percentage of all maternal deaths, unsafe abortion-related mortality is related to the estimated number of maternal deaths,[65,66] to calculate the numbers of unsafe abortion deaths.

Annex 1 gives a detailed description of the estimation of unsafe abortion incidence and related mortality, using the numerical data and qualitative information in the database. Country-specific estimates were corroborated against information from other sources on total fertility rate, use of modern and traditional contraceptive methods, and other proximate determinants of fertility, as available.

6.1 Operational definition of unsafe abortion

Induced abortions may be performed either within the law, or outside the national legal framework. The medical standards of abortion procedures vary, whether performed within or outside the law.

When performed within the legal framework, the safety of the procedure will depend on the requirements of the law, and the resources and medical skills available. In some countries, lack of resources and possibly skills may mean that even abortions that meet the legal and medical requirements of the country would not necessarily be considered sufficiently safe in high-resource settings.

Induced abortions outside the legal framework are frequently performed by unqualified and unskilled providers, or are self-induced; such abortions often take place in unhygienic conditions, and involve the use of dangerous methods or incorrect administration of medications. Even when performed by a medical practitioner, an abortion that is carried out in secret, outside a recognized facility, generally carries an additional risk: medical back-up is not immediately available in an emergency, the woman may not receive appropriate post-abortion attention and care, and if complications occur, the woman may hesitate to seek care. The relative safety of unsafe abortion differs by country depending on the skills of the providers and the methods used, but is also linked to the *de facto* application of the law.[10]

The estimates given in this document are intended to reflect induced abortions that carry greater risks than those carried out officially for reasons accepted in the laws of a country.

6.2 Unsafe abortion incidence and mortality rates and ratios

Absolute numbers of unsafe abortions cannot be compared meaningfully across different regions and subregions because of differing population size. Ratios (relative to live births) and rates (relative to women of reproductive age) are therefore calculated to allow comparisons. The unsafe abortion incidence and mortality rates, ratios and percentages are defined as follows.

Unsafe abortion rate: The unsafe abortion rate is the annual number of unsafe abortions per 1000 women aged 15–44 years. This measure describes the level of unsafe abortion in a population.

Unsafe abortion ratio: The unsafe abortion ratio is the number of unsafe abortions per 100 live births (as a proxy for pregnancies).[b] The unsafe abortion ratio indicates the likelihood that a pregnancy will end in unsafe abortion rather than a live birth.

Unsafe abortion mortality ratio: The unsafe abortion mortality ratio is the number of deaths due to unsafe abortion per 100 000 live births.[b] This is a subset of the maternal mortality ratio and measures the risk of a woman dying due to unsafe abortion relative to the number of live births.

Unsafe abortion case-fatality: The unsafe abortion case-fatality expresses the estimated number of deaths per 100 000 unsafe abortion procedures; it is sometimes expressed per 100 procedures. This rate shows the mortality risk associated with unsafe abortion.

Percentage of maternal deaths due to unsafe abortion: The percentage of maternal deaths due to unsafe abortion is the number of abortion deaths per 100 maternal deaths. When maternal mortality is relatively low and where other causes of maternal death have already been substantially reduced, a small number of unsafe abortion deaths may account for a significant percentage of maternal deaths. This measure is, therefore, not particularly suitable for comparison purposes.

6.3 Selecting the denominator for rates and ratios: all countries vs countries with evidence of unsafe abortion

The purposes of using rates, ratios and percentages are to show the relative health burden of unsafe abortion in a specified region, and to allow comparison across regions. In previous estimations of unsafe abortion, these measures were calculated using population data for all countries of a region. For this report, measures have also been calculated including only the countries of the region with evidence of unsafe abortion. This latter relationship is shown in parentheses in Table 2 and elsewhere, unless where specified otherwise. In summary, the relationships are calculated with two different denominators: (1) one relating to the population for all countries of a region; and (2) one relating to the population for the countries of that region with evidence of unsafe abortion, thereby excluding from the denominator the populations of countries where there is no evidence of unsafe abortion.

Unsafe abortion is negligible in eastern Asia and in some developing countries of other regions where abortion is legal and relatively accessible, in particular Cuba, Singapore, Tunisia, Turkey and Viet Nam. Rates and ratios that exclude these countries therefore provide a better reflection of the situation of unsafe abortion in the region or subregion as a whole. With a smaller, but more appropriate, denominator by excluding countries where unsafe abortions are negligible or do not occur at all, the rates and ratios (shown in parentheses) are higher than those that include all countries in the denominator for the regional estimates.

[b] The number of live births serves as a proxy for the number of pregnancies. A more appropriate denominator would be the total number of pregnancies (live births, stillbirths, induced and spontaneous abortions, ectopic pregnancies), but this figure is rarely available. Live births are therefore used in the denominator for international comparisons.

6.4 Estimating subregional, regional and global incidence of unsafe abortion and associated mortality

The global and regional estimates for unsafe abortion in 2003 presented below are based on data and information available as of 31 May 2006. This allowed reasonable time for the collection of data for the specific period, where available, and also matched the count of legal abortions for 2003 by the Guttmacher Institute. The incidence of unsafe abortion and associated mortality were first estimated for countries with a population of 100 000 or more, as described in detail in Annex 1. Estimates were then calculated for the geographical regions, as defined by the United Nations (see Annex 2); population estimates for 2003 by the United Nations Population Division[3] were used to arrive at aggregated numbers, rates and ratios for unsafe abortion. Estimates were also calculated for WHO regions (Annex 3).

Country-specific unsafe abortion rates were applied to the number of women aged 15–44 years in each country, and combined to arrive at weighted average subregional estimates; these were further aggregated to arrive at regional and global estimates. The number of deaths due to unsafe abortion was estimated for countries by applying the estimated proportion of maternal deaths due to unsafe-abortion-related complications to the estimated number of maternal deaths[66,67] for the year 2003; these figures were aggregated to give subregional, regional and global numbers of abortion-related deaths.

Because of the level of uncertainty, estimates of country incidence and mortality were calculated solely for the purpose of aggregation at regional and global levels, and are not published. Aggregated estimates are quite robust; nevertheless, estimates of the incidence of unsafe abortion and the resulting mortality necessarily have some degree of uncertainty. They should be considered only as best estimates given the information currently available. It is likely that the true incidence of unsafe abortion and the related mortality rate are higher than estimated.

Figure 3. Estimated annual incidence of unsafe abortion per 1000 women aged 15-44 years, by subregions, 2003

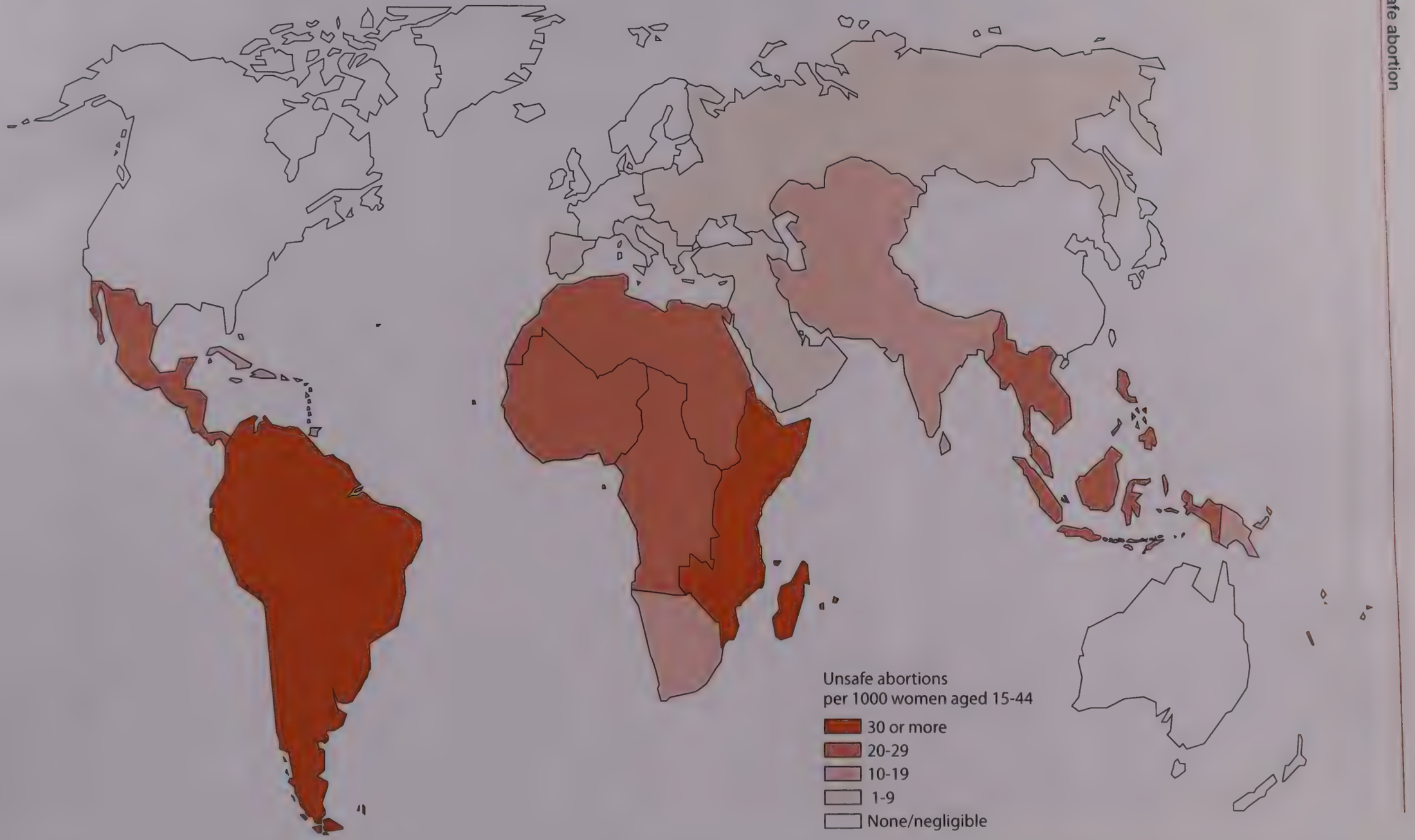


Figure 4. Estimated annual incidence of unsafe abortion to 100 live births, by subregions, 2003

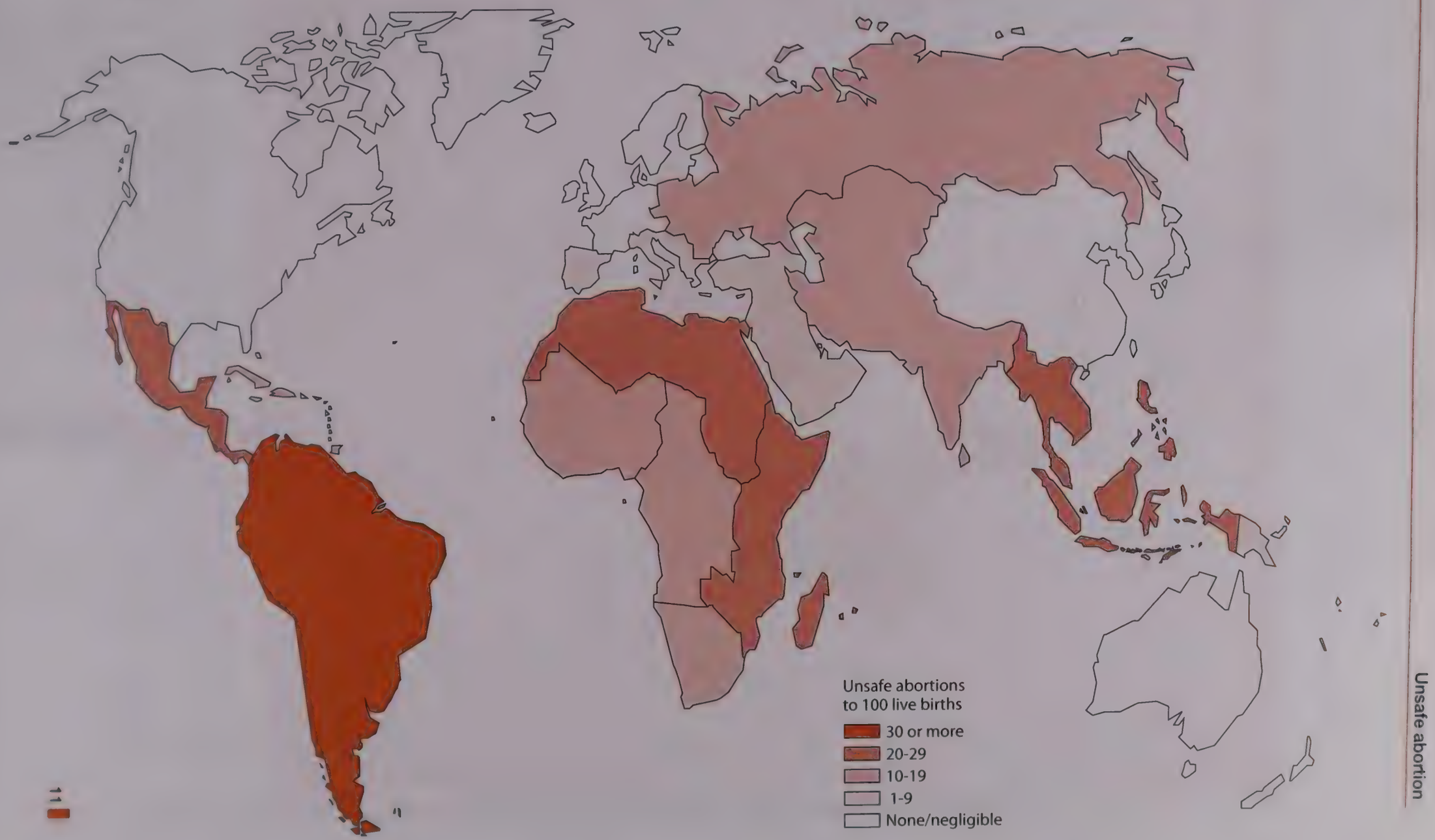
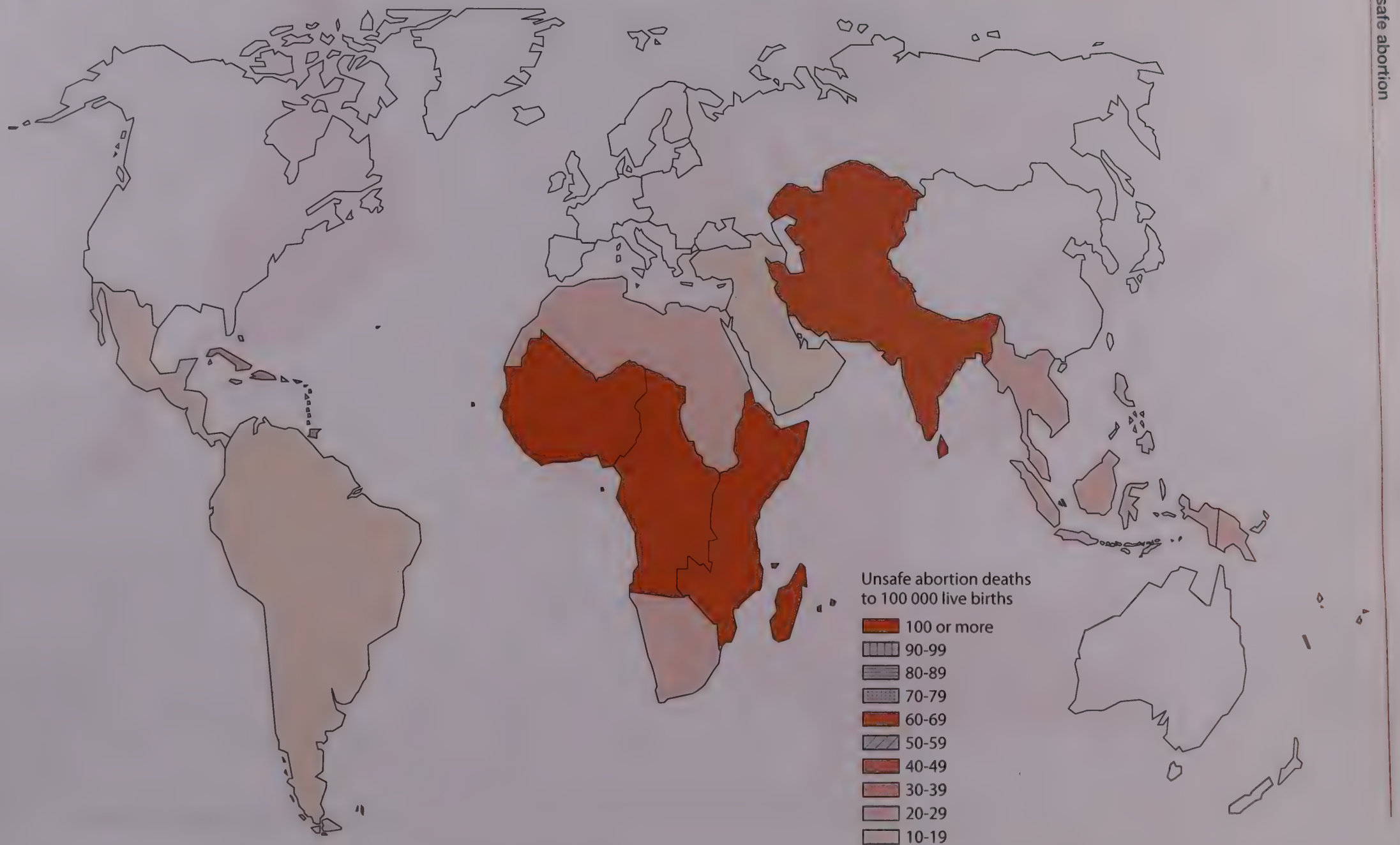


Figure 5. Estimated annual maternal deaths due to unsafe abortion to 100 000 live births, by subregions, 2003*



* This map is based on the precise estimates while Table 2 gives rounded numbers

Table 2. Global and regional estimates of annual incidence of unsafe abortion and associated mortality, 2003§

	Unsafe abortion			Mortality due to unsafe abortion		
	Number (rounded)†	Incidence rate (per 1000 women aged 15–44 years)	Incidence ratio (per 100 live births)	Number of deaths (rounded)†	% of all maternal deaths	Mortality ratio (per 100 000 live births) (rounded)†
World	19 700 000	14 (22)	15 (20)	66 500	13	50 (70)
Developed countries*	500 000	2 (6)	3 (13)	<60	4 (8)	° (2)
Developing countries	19 200 000	16 (24)	16 (20)	66 400	13	60 (70)
Least developed countries	4 000 000	25	15	24 000	10	90
Other developing countries	15 300 000	15 (23)	17 (22)	42 400	15 (16)	50 (60)
Sub-Saharan Africa	4 700 000	31	16	35 600	14	120
Africa	5 500 000	29	17	36 000	14	110
Eastern Africa	2 300 000	39	20	17 600	17	160
Middle Africa	600 000	26	12	5 000	10	100
Northern Africa	1 000 000	22 (23)	20 (21)	1 100	11	20
Southern Africa	200 000	18	18	300	9	20
Western Africa	1 500 000	28	14	11 900	13	110
Asia*	9 800 000	11 (20)	13 (18)	28 400	12 (13)	40 (50)
Eastern Asia*	°	°	°	°	°	°
South-central Asia	6 300 000	18	16	24 300	13	60
South-eastern Asia	3 100 000	23 (27)	27 (31)	3 200	14 (16)	30
Western Asia	400 000	8 (13)	7 (10)	1 000	11 (12)	20 (30)
Europe	500 000	3 (6)	6 (13)	<60	6 (8)	1 (2)
Eastern Europe	400 000	5 (6)	13 (14)	<50	6 (7)	2
Northern Europe	2 000	0.1 (1)	0.1 (2)	°	3 (22)	° (3)
Southern Europe	100 000	3 (6)	7 (14)	°	11 (19)	1
Western Europe	°	°	°	°	°	°
Latin America and the Caribbean	3 900 000	29 (30)	33 (34)	2 000	11	20
Caribbean	100 000	16 (28)	19 (26)	200	12	30 (40)
Central America	900 000	25	26	300	11	10
South America	2 900 000	33	38	1 400	11	20
Northern America	°	°	°	°	°	°
Oceania*	20 000	11	8	<100	10	20

§ Rates, ratios and percentages are calculated for all countries of each region, except Asia (which excludes Japan) and Oceania (which excludes Australia and New Zealand). Rates, ratios and percentages in parentheses were calculated exclusively for countries with evidence of unsafe abortion. See Section 6.3 for a detailed explanation. Where the difference between the two calculations was less than 1 percentage point, only one figure is shown.

† Figures may not exactly add up to totals because of rounding.

* Japan, Australia and New Zealand have been excluded from the regional estimates, but are included in the total for developed countries.

° No estimates are shown for regions where the incidence is negligible.

7. Regional and global incidence of unsafe abortion and associated mortality

7.1 Global and regional estimates and research

Table 2 and Figures 3 to 5 show the estimated incidence of unsafe abortion and associated mortality, globally and by geographical region and subregion (see Annex 2 for the countries in each subregion). Worldwide, the estimates indicate that almost 20 million unsafe abortions were carried out in 2003, i.e. one in ten pregnancies ended in an unsafe abortion, giving a ratio of one unsafe abortion to about seven live births. For the period around 2000, 19 million unsafe abortions per year were estimated.[53]

Globally, 19–20 million unsafe abortions are estimated to have occurred each year from 1993 to 2003, as the transition to low fertility has advanced; contraceptive prevalence has increased, but so has unmet need for family planning as smaller families become the norm. However, caution is needed when comparing estimates of unsafe abortion for different periods, in view of the limitations of the estimates and the increasing knowledge base, which may mean that earlier estimates were too low.

Estimates necessarily depend on the amount and quality of information available; recently published research from Sub-Saharan Africa, Southern Asia, and Latin America has helped improve the precision of the estimates. So, while the estimate of the global number of unsafe abortions is close to earlier figures, the regional estimates present a somewhat different picture. The current figures for Africa are higher than the previous cautious estimates, better reflecting the actual situation. It is nevertheless encouraging to note that the 1996 change of law in South Africa is now having a positive effect in reducing the number of unsafe abortions in the subregion. Unsafe abortion numbers are also lower in South-central Asia, and Asia as a whole, as the most recent assessment of abortion in India shows fewer procedures that do not meet national requirements. Recent research and improved access to data for South America have led to estimates indicating that the number of unsafe abortions in the region may have stabilized.

There is still room for further research, as well as assessments of abortion incidence and mortality, in the regions mentioned. At the same time, major information gaps exist for other parts of the world. For example in Oceania, abortion numbers reported are usually well within what would be expected for women hospitalized for miscarriage, while the abortion debate goes on and the local press covers the legal proceedings of prosecutions for illegal abortion.[67] Information is scant and estimates remain guarded for several countries of Northern Africa and Western Asia. Reports suggest that unsafe abortions may be increasing in several of the newly independent states (formerly part of the Soviet Union), as a result of increased fees and fewer services for legal abortions, but there are, as yet, insufficient data or research to confirm this.

7.2 Rate and ratio calculations including only countries with evidence of unsafe abortion

In the previous estimates of unsafe abortion, the rates and ratios (see Section 6.2) were calculated to include all countries of a region. This has also been done in the current round, but in addition, rates and ratios have been calculated using only the countries of the region with evidence of unsafe abortion; in this way, countries where there is no evidence of unsafe abortion are excluded from the denominator (see Section 6.3).

The difference between the two calculations is particularly evident for unsafe abortion incidence, while the effect on mortality calculations is marginal. The unsafe abortion incidence and mortality rates and ratios are always higher (see Table 2), sometimes substantially so, when calculated relative to the populations of countries where there is some evidence of unsafe abortion.[c] The difference is

[c] Countries where unsafe abortion occurs in parallel with legal and safe abortion are included, although in some of these cases unsafe abortion numbers are small.

particularly marked for Asia (20 vs 11 unsafe abortions per 1000 women aged 15–44 years) when the demographically important region of Eastern Asia is excluded from the denominator. It is also apparent for the Caribbean (28 vs 16 per 1000 women aged 15–44) when Cuba is excluded. On the other hand, the exclusion of Cuba makes hardly any difference to the rates for Latin America as a whole (30 vs 29 per 1000 women aged 15–44). The differences in South-eastern Asia (27 vs 23 per 1000 women aged 15–44) and Western Asia (13 vs 8 per 1000 women aged 15–44) are the result of excluding Singapore and Viet Nam, and Turkey, respectively, from the denominator. While the numbers are lower in absolute terms, the abortion rate and ratio also become higher for European regions and developed countries (6 vs 2 per 1000 women aged 15–44). For other regions, the rates and ratios barely change when the denominator is restricted.

The global figures show the full effect of the smaller denominator: the 19.7 million unsafe abortions correspond to 22 or 14 per 1000 women aged 15–44, and to 20 or 15 per 100 live births. For developing countries, the incidence rate increases from 16 to 24 per 1000 women of reproductive age, when the denominator is restricted. The few developing countries with liberal abortion laws and no evidence of unsafe abortion all fall in the group of "other developing countries", leading to a marked difference in the incidence rate and ratio. The group of least developed countries shows a high unsafe abortion rate of 25 per 1000 women of reproductive age.

The alternative figures presented in parentheses in Table 2 and discussed above allow comparison between subregions, and show clearly where unsafe abortion is a major public health concern. The numbers are alarming and cannot be disregarded.

7.3 Regional estimates

Over 60% of the world population lives in countries where induced abortion is allowed for a wide range of reasons;[10] nevertheless, some of these countries have a high incidence of unsafe abortion. The estimates show that only about 40% of women of reproductive age live in countries where abortion is legally available on request and there is no evidence of unsafe abortion (Annex 1); 1 in 4 births take place in these countries. On the other hand, there are a number of countries, mainly in the Eastern Europe region, that allow abortion on broad grounds, but where unsafe abortions still occur outside the legal framework, because of the cost of legal abortion and other social factors.

Unsafe abortion rates close to 30 per 1000 women of reproductive age are seen in both Africa and Latin America; however, because of the higher relative number of births, the unsafe abortion ratio for Africa is only half that for Latin America. However, the range of estimates for Africa is wide: Eastern Africa has the highest incidence rate of any subregion, at 39 per 1000 women aged 15–44, while Southern Africa has among the lowest, at 18 per 1000 (not counting legal abortions of 5 per 1000 women). In Eastern, Western and Middle Africa, where maternal mortality is high, the unsafe-abortion-related mortality ratio is much higher than anywhere else – double that of Asia and more than 5 times that of Latin America. Morbidity is an even more frequent consequence of unsafe abortion, and it is thus not surprising that the total disease burden for Africa is exceptionally high, threatening women's lives and health, and straining scarce resources.

Middle, Western and Eastern Africa all have a contraceptive prevalence[24] below 25%, with heavy reliance on traditional methods. In Southern and Northern Africa, contraceptive prevalence among married women is around 50%, and there is greater reliance on reversible modern methods (36% and 43%, respectively). This could help explain the moderate abortion rates of around 20 per 1000 women, as compared to 26 to 39 per 1000 in other parts of Africa.

The incidence of unsafe abortion for Latin America overall appears to have stabilized, and may have passed its peak. If Cuba is excluded from the calculation, the incidence rate for the Caribbean falls between those for Central America (25 per 1000) and South America (33 per 1000). The prevalence of modern contraceptives ranges from 57% to 66% in Latin America; however, 43–50% is accounted for by sterilization (Fig. 1). The moderate 29–38% prevalence of reversible method use could mean that unsafe abortion is being used to space births, to arrive at a total fertility rate

of around 2.5 per woman.[23] Improved access to a range of birth-spacing methods could reduce the number of unintended pregnancies and hence the need for abortion. Almost 2000 deaths from unsafe abortion occur, approximately 20 per 100 000 births; this is the lowest among the developing regions, and is attributable to the relatively well functioning health services in Latin America.

South-central Asia has the highest number of unsafe abortions of any subregion, owing to the sheer size of its population; in 2003, there were 6.3 million unsafe abortions, or 18 per 1000 women of reproductive age, which poses a formidable challenge. Use of modern contraceptive methods among married women is modest (42%), and two-thirds of this use relates to sterilization; the high number of unsafe abortions is probably the result of a desire to space births. Nevertheless, among Asia's subregions, South-eastern Asia has the highest incidence rate, at 27 per 1000 women aged 15–44 (excluding countries with no evidence of unsafe abortion); this rate is similar to those of the Caribbean and Central America. South-eastern Asia has a 51% prevalence of modern family planning methods, almost exclusively reversible methods (43%). It appears, though, that abortion is required to keep fertility low. The unsafe-abortion-related mortality for Asia is 2–3 times that for Latin America, but less than half that for Africa, reflecting the relative standards of health services and infrastructure.

While it is acknowledged that there is a problem of unsafe abortion in Oceania, data are exceptionally scant and, as a consequence, estimates vary.

7.4 Trends in unsafe abortion rates

Figure 6 compares the estimated abortion rates for 2000 and 2003, by subregion. The rates are those calculated for all countries of each region, as the alternative calculation (for only countries with evidence of unsafe abortion) was not done in 2000. The comparisons are illustrative of trends, but it should be borne in mind that the studies in the recent update had better coverage, especially in sub-Saharan Africa.

Figure 6. Incidence of unsafe abortion per 1000 women aged 15-44 years, 2000 and 2003

Source: Table 2 and Reference 53
Rates are calculated for all countries of each region.

The new research evidence from Africa shows higher rates of unsafe abortion in 2003 than in 2000. However, the apparent increase may be related to the better coverage as a result of new studies. In any case, the 2003 estimates more accurately reflect the situation in Africa.

Estimates for South-central Asia reflect improvements in service provision that have taken place over a number of years. Rates for South-eastern Asia have changed little, while the trend in Western Asia is unclear, since the data available are insufficient and of uncertain quality.

For Latin America, an increased availability of data has improved the precision of the estimates. Unsafe abortion rates in South America appear to be stabilizing, while in the Caribbean there may well have been an increase. This is possibly related to the rapid transition to low fertility in the Caribbean region, which now has the lowest TFR of all the developing subregions. The TFR for Central America fell by 0.8 over the past 10 years and by 0.3 over the past 5 years – the largest decrease in the Latin America region. This suggests that the rise in the unsafe abortion rate may be temporary.

7.5 Unsafe abortion mortality

There has been a small reduction in the number of deaths in 2003 due to unsafe abortion compared with the estimate for 2000. This is in line with the assumption that maternal deaths in general may be slowly declining globally, probably as a result of improved maternity services and better care[d]. Overall, 66 500 maternal deaths were estimated to have been due to unsafe abortion in 2003. Nearly all of these deaths could have been prevented if the need for family planning had been met, and if abortion services had been legally available and affordable everywhere.

Globally, the proportion of maternal deaths due to unsafe abortion has remained close to 13% over time, although there have been regional variations. The percentage of maternal deaths due to unsafe abortion is relatively difficult to interpret. In countries where maternal mortality is relatively low and other causes of maternal death have already been substantially reduced, a small number of deaths due to unsafe abortion may account for a significant percentage of maternal deaths. This is, for example, the case in some countries of Latin America. On the other hand, in the least developed countries, 10% of all maternal deaths are due to unsafe abortion, but the ratio of maternal deaths to live births is high, at 90 per 100 000, while in other developing countries, 15% of maternal deaths are due to unsafe abortion but the ratio of maternal deaths to live births is 50 to 100 000 births – just over half that in the least developed countries. Clearly, when maternal mortality from all causes is high, the percentage of these deaths caused by unsafe abortion is relatively low. Therefore, the ratio of unsafe abortion deaths per 100 000 live births is a better measure of the relative risk of maternal death due to unsafe abortion.

The last column in Table 2 shows the unsafe abortion mortality ratio, i.e., unsafe-abortion-related maternal deaths per 100 000 live births. In Eastern, Middle and Western Africa, 100 or more maternal deaths per 100 000 live births are due to unsafe abortion. In no other subregion does unsafe abortion lead to so many maternal deaths. Within Africa, Northern and Southern Africa have ratios as low as those found in Latin American subregions, which are among the lowest in the developing countries.

[d] New maternal mortality estimates for 2005 show that the improvement is slower than assumed and indicate that the corresponding unsafe abortion deaths for 2005 may be close to 70 000.

7.6 Risk of death due to unsafe abortion

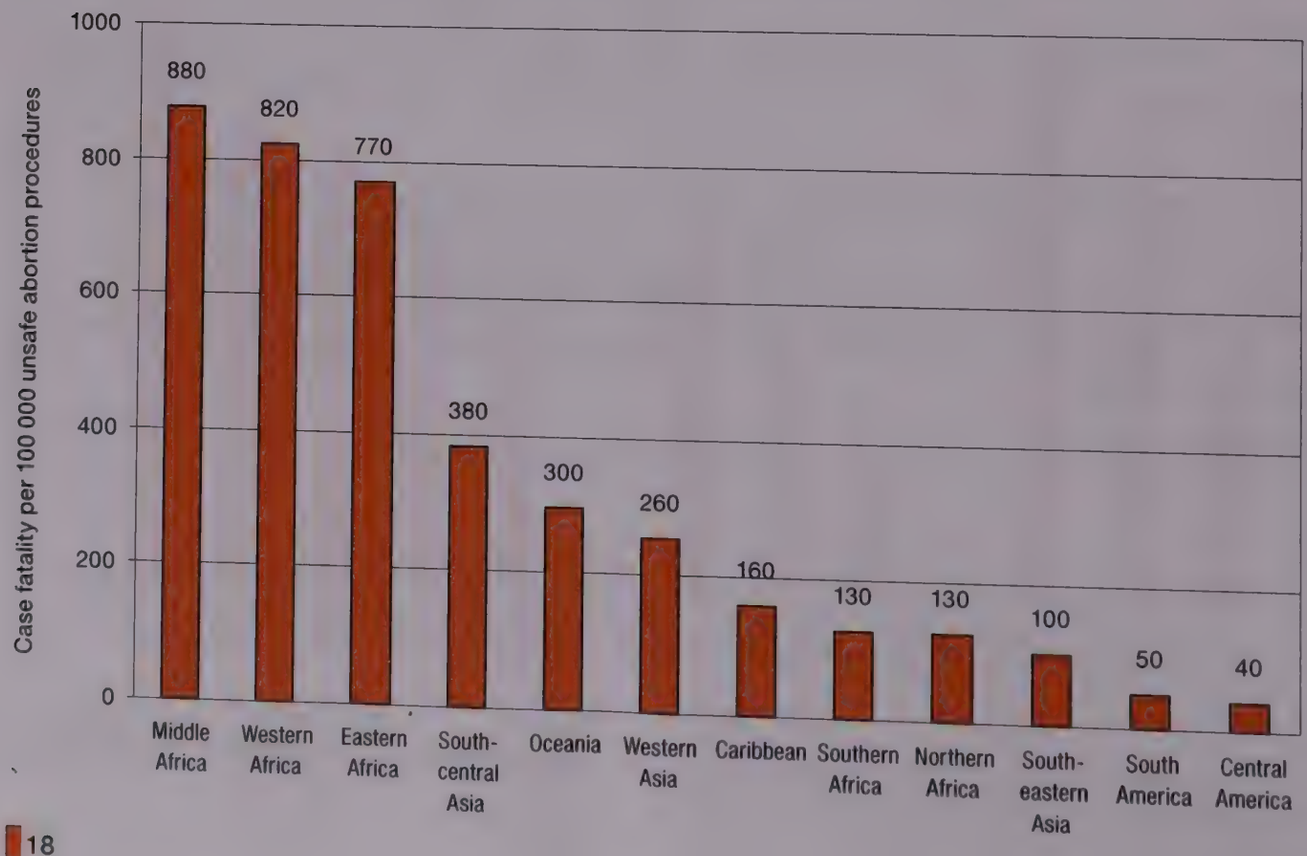
Table 3 shows the global and regional risk of death due to complications of unsafe abortion.

Table 3. Case-fatality rate of unsafe abortion deaths per 100 000 unsafe abortion procedures, 2003

	Case-fatality: estimated number of deaths per 100 000 unsafe abortion procedures (rounded)
World	300
Developed regions	10
Developing regions	350
Least developed countries	600
Other developing countries	300
Sub-Saharan Africa	750
Africa	650
Asia	300
Latin America & the Caribbean	50
Oceania	300

The estimated case-fatality rate (deaths per 100 000 unsafe abortion procedures) ranges from a high of 750 per 100 000 in sub-Saharan Africa to 10 per 100 000 in developed regions, with an average of 350 per 100 000 for developing regions. Table 3 also shows that the global case-fatality rate associated with unsafe abortion is some 550 times higher than the rate associated with legal induced abortions in the USA (0.6 per 100 000 procedures);[36] in sub-Saharan Africa, the rate is well over 1000 times higher. Even in developed countries, the case-fatality rate for unsafe abortion is 20 times higher than that for legal induced abortion.

Figure 7. Number of deaths due to unsafe abortion per 100 000 unsafe abortions, by subregion, 2003



The differences in the risk of death associated with unsafe abortion across subregions of the developing world can be seen in Figure 7. The risks associated with unsafe abortion reflect the procedures used, and the availability, access and quality of services for management of complications. At the high end of the spectrum are the African subregions, where high-risk abortion methods, failing infrastructure, and poor public health facilities result in case-fatality rates of over 800 per 100 000 procedures. At the opposite end, South and Central America have case-fatality rates of less than 100 per 100 000 procedures. For Southern and Northern Africa and South-eastern Asia, the rates appear low but are still almost 200 times higher than that associated with a legal abortion in the USA.

The risk of death due to unsafe abortion is highest in three subregions of sub-Saharan Africa – Middle, Western and Eastern Africa – at 800–900 deaths per 100 000 unsafe abortions, followed by South-central Asia. Latin America and the Caribbean, on the other hand, is the developing region with the lowest case-fatality rate (see Table 3).

7.7 Maternal death by age

To explore the pattern of maternal deaths due to unsafe abortion by age, we applied the regional age distributions of the incidence of unsafe abortion[52] to the estimated unsafe abortion deaths. This assumes that each age group has the same risk of death due to unsafe abortion. Any difference in risk in the different age groups is difficult to quantify because of a lack of data. It can, however, be assumed that women in the youngest age group are likely to have a higher risk of morbidity and mortality from unsafe abortion, as they are biologically more vulnerable and likely to have fewer resources to acquire a less risky unsafe abortion.

Table 4 shows the estimated number of deaths from unsafe abortion by age group for the developing regions. Almost half of the deaths occur among adolescents and adults under 25 years. The percentage distributions of unsafe abortions and of unsafe abortion deaths by age are shown in Figure 8.

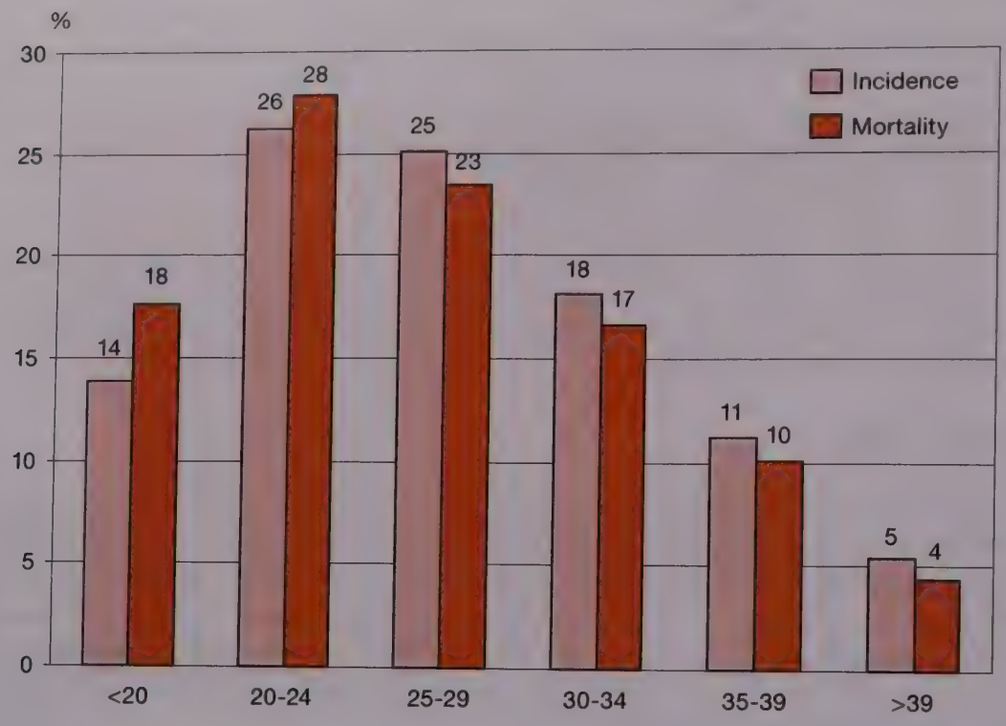
For developing regions the estimated case-fatality rate in the youngest age group is 440 per 100 000 procedures, declining by increasing age to 280 in the age group 40 and over.

Table 4. Estimated number of deaths due to unsafe abortion by age, 2003

	Age group (years)						
	All ages	<20	20-24	25-29	30-34	35-39	>39
Developing regions	66 500 (100%)	11 800 (18%)	18 500 (28%)	15 600 (23%)	11 000 (17%)	6 700 (10%)	2 900 (4%)
Africa	35 900	9 000	11 500	7 200	4 500	2 800	900
Asia, excluding Eastern Asia*	28 500	2 400	6 400	7 800	6 300	3 700	1 900
Latin America and the Caribbean	2 000	300	600	500	300	200	100
Oceania	60	5	10	20	10	10	4

* Legal, safe abortion is widely available and, in general, quite accessible in Eastern Asia and, therefore, the incidence of unsafe abortion is assumed to be negligible.

Figure 8. Percentage distributions of estimated unsafe abortions and associated mortality by age, all developing regions, 2003



8. Conclusions

Research and collection of data on unsafe abortion need to be strengthened to cover the range of relevant critical issues. Better information will support a more informed scientific discourse, and help set in motion the processes to put unsafe abortion on the political agenda. Needed research should cover, but not be limited to, the incidence of unsafe abortion and associated mortality, post-abortion complications, sociodemographic characteristics of women who have abortion, gestation and parity at abortion, decision-makers and decision-making processes relating to having an abortion, place and circumstances of abortion, abortion providers, unmet need for family planning, and method mix of family planning.

Major progress has been made in some areas of sexual and reproductive health, most notably in contraceptive use. However, unsafe abortions, though entirely preventable, continue to occur in almost all developing countries. The major public health implications include, but are not limited to, maternal morbidity and mortality. In addition, there are financial costs to women and to health services for treating complications.

Governments need to assess the health impact of unsafe abortion, reduce the recourse to abortion by expanding and improving family planning services, and design abortion policies and interventions to improve women's health and well-being. Preventing unintended pregnancies and unsafe abortion must continue to be a high priority for improving women's sexual and reproductive health. Information and services for family planning and abortion care should be readily available, including to young people.

In several countries, the legalization of abortion has not been followed by elimination of unsafe abortion. This may be because women are unaware that safe abortion services are available, or lack the resources, time or decision-making power to use the services, or because the services are inadequate to meet demand. Other factors inhibiting use of safe abortion where it is legal are lack of privacy and confidentiality, poor access, and discouraging attitudes of health care providers.

Women who wish to terminate their pregnancy should have ready access to reliable information, compassionate counselling and, in parallel, services for the prevention of subsequent unintended pregnancy and management of complications. It is vital that governments and intergovernmental and nongovernmental organizations deal openly with unsafe abortion as a major public health concern.

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Annex 1

Estimating the incidence of unsafe abortion and associated mortality

1. Data on unsafe abortion

In all countries, access to induced abortion is largely dependent on the legal framework. Where induced abortion is restricted and largely inaccessible, or legal but difficult to obtain, little information is available on abortion practice. In such circumstances, its occurrence tends to be unreported or under-reported, and it is difficult to quantify and classify. What information is available is inevitably not completely reliable, because of legal, ethical and moral considerations that constrain reporting.

Whether legal or illegal, induced abortion is generally stigmatized and frequently censured by religious teaching or ideologies. Women are often reluctant to admit to having had an induced abortion, especially when it is illegal. Surveys show that under-reporting occurs even where abortion is legal.[1,2,3,4] When abortions are clandestine, they may not be reported at all or may be reported as spontaneous abortion (miscarriage).[5,6] The language used to describe induced abortion reflects this ambivalence: terms include "induced miscarriage" (*fausse couche provoquée*),[7] "menstrual regulation", and "regulation of a delayed or suspended menstruation".[8] It is therefore not surprising that unsafe abortion is one of the most difficult indicators to measure.

2. WHO's database on unsafe abortion

For the past 25 years, WHO has maintained a database on unsafe abortion and associated mortality, which today has over 3000 references, mainly related to developing countries, containing both quantitative and qualitative data. Information relevant to understanding and measuring unsafe abortion covers data from hospital records and surveys, legal developments, and research studies on abortion providers, unsafe abortion methods, abortion-seeking behaviour and post-abortion care. Information is collected from searches of library databases, by tracing references, and from the Internet, WHO-supported country studies, other United Nations (UN) agencies, conference papers, unpublished reports, national authorities, and nongovernmental and other organizations. Published and unpublished reports and papers are screened for the scientific rigour of the study, and relevant information and data are included in the database, with details of sample size, study type, coverage, and other relevant characteristics. The abortion is registered using the authors' terminology, i.e., as simply "abortion" or specifically as "induced", "spontaneous" or "unsafe" abortion.

Incidence data from hospital or community studies are recorded in terms of the number of abortions per 100 women (the rate), or per 100 live births (the ratio). Some studies report national estimates. Data on admissions to hospital for post-abortion care from national reports or ministry of health statistics are recorded, and ratios calculated when births are available from the same source. Caseload data are noted when available. Abortion mortality data are typically reported as a percentage of maternal deaths, or per 100 000 live births, or per 100 000 women of reproductive age.

In the following sections, we outline the rationale, assumptions and methods of estimation of unsafe abortion incidence and mortality. Estimates were assessed for consistency by comparison with available information from other sources on total fertility rate, prevalence of modern and traditional contraceptive methods, and other proximate determinants of fertility. Estimates were generated first by country, and then aggregated by region and globally. The same general approach was applied for the updates of 1993,[9] 1997,[10] and 2000.[11]

3. Rationale and procedures for estimating incidence of unsafe abortion and associated mortality

Where induced abortion is largely restricted or illegal, its occurrence can be estimated only indirectly, using the available incomplete information on incidence and mortality.[12] This figure is then adjusted to correct for misreporting and under-reporting, to estimate annual country-specific unsafe abortion rates.

The adjustments depend largely on the methods commonly used to perform abortion, the providers of unsafe abortions,[13,14] and the existing abortion law and its application.[15,16,17] In addition, when applicable, calculations also take into account the fact that the incidence is generally lower in rural than in urban areas[18,19,20] by applying a weighting factor, using the UN estimates of urban and rural populations.[21] To circumvent the problem of induced abortion being misreported as spontaneous, the combined incidence of spontaneous and induced abortion is used, when available, and corrected for the likely incidence of spontaneous abortion.[14] It is assumed that subnational data can be extrapolated to country level with adjustments. The resulting country estimate is finally assessed for consistency in the light of the total fertility rate (TFR),[22] reported contraceptive prevalence[23],[24] and trends, and unmet need for family planning.[25,26,27]

The estimation procedure used for this update started with an in-depth review of over 600 recent reports (published since the estimation for 2000) containing data on abortion or information on abortion methods, abortion providers, access and legal developments. These sources were assessed together with the existing data to ascertain the current situation with regard to abortion laws, policies and practice in the different countries.

The sources for the incidence data, an indication of the availability of data, and an outline of estimation methods are given in section 3.1 of this Annex, while calculations are detailed in section 4. Availability of mortality data and methods are summarized in section 3.2, and the calculations detailed in section 5.

The estimates given in this document are intended to reflect induced abortions that carry greater risks than those carried out officially for reasons accepted in the laws of a country (see Section 6.1 of main text).

3.1 Estimation of unsafe abortion incidence: availability and sources of data

Unsafe abortion incidence is estimated from hospital data, as suggested by Singh & Wulf,14 by adjusting the abortion/birth ratio for the expected percentage (3.4%)[a] of spontaneous abortions that occur at 13–22 weeks' gestation. These are assumed to require hospital treatment, whereas women in developing countries who have a miscarriage before 13 weeks rarely turn to a hospital. Intercountry differences in the tendency to use hospitals for pregnancy-related conditions are assumed to apply equally to treatment of abortion complications and deliveries. The hospital unsafe abortion ratio – the "tip of the iceberg" – is further adjusted based on the assumption that most induced abortions do not lead to complications requiring hospitalization; therefore a multiplier of between 2 and 714,[28,29,30,31] (established on the basis of studies in various locations or of similarity to countries with a known multiplier) is applied to the hospital unsafe abortion ratio to arrive at an estimate of the national unsafe abortion ratio. The "safer" the abortions, the higher the multiplier. The abortion ratio is finally converted into an abortion rate, using UN estimates of the numbers of women of reproductive age and of live births for the reference year.[22]

While some community studies of abortion report results in relation to number of births, most report the proportion of women of reproductive age who have ever had an induced unsafe abortion, or who have had one in the past year. Rates of women who have ever had an induced abortion are converted into annual rates of abortion per 1000 women aged 15–44 years. When the ratio

[a] Recent national data from Brazil indicate that miscarriages registered in hospitals may be as low as 3% of births.

is reported, the corresponding abortion rate is calculated using UN estimates of the numbers of women of reproductive age and of live births at the time of the survey, corrected for under-reporting and adjusted for spontaneous abortions, if included.

For four countries, a national estimate of the incidence or number of unsafe abortions was available, without supporting evidence, from a national family planning association or research group, and was used to calculate the abortion rate. A small number of countries, for which no information was available, were assumed to have the same rate as other countries in the region, or as other countries with similar abortion laws, fertility and contraceptive use.

The various sources of data are summarized in Table A1.1.

Table A1.1 Sources of data for estimating incidence of unsafe abortion, 2003

	% of all births	% of all women aged 15–44 years	% of all unsafe abortions
Abortion legal and no evidence of unsafe abortion	24	38	0
National community study, hospital data or national estimate	57	48	79
Subnational community study or hospital data	16	12	18
Estimate from other country or regional average	4	2	3
Total (%)	100	100	100
Total number (thousands)	132 724	1 454 484	19 700

As shown in Table A1.1, one-quarter of births take place, and almost 40% of women live, in countries where abortion is legally available on request and there is no evidence of unsafe abortions. In addition, 53% of births, 44% of women and three-quarters of estimated abortions are in countries for which there is a reliable national study or hospital data. The remaining 20% or so of births and of women, and 25% of unsafe abortions, are in countries with only subnational data, for which assumptions are needed regarding rural–urban distributions.

As shown in Table A1.2, the data on which the incidence estimates are based relate to 1995 or later for 62% of births, for 51% of women and for 86% of unsafe abortions; most of these data are from 2000 or later. Data for about 10% of births, women and unsafe abortions originate from before 1995. Only for about 4% of births and 2% of women were estimates calculated using data from other countries or the subregional rate. Recent incidence data were therefore available to calculate estimates for most countries, using the methods detailed in section 4 of this Annex.

3.2 Estimating unsafe abortion mortality: availability and sources of data

Abortion-related mortality occurs mainly as a result of unsafe abortion, since spontaneous abortion is only rarely a cause of death. Unsafe abortion-related mortality is expressed in relation to the estimated number of maternal deaths for 2003.[32, 33]

Where available, information from community studies is used. However, for many countries, information comes from hospital-based studies; the accuracy of reporting of maternal deaths due to unsafe abortion will therefore depend on the tendency of women to seek hospital care when faced with complications. However, the proportion of maternal deaths due to unsafe abortion in hospitals is a reasonable approximation of the proportion of all pregnancy-related deaths. Where relevant, adjustments were made for rural/urban differences. For countries for which no data on abortion deaths were available, it was assumed that the proportion of maternal deaths related to abortion was

Table A1.2 Availability of data for estimating unsafe abortion incidence

Availability of data	% of all births	% of all women aged 15-44 years	% of all unsafe abortions
Abortion legal and no evidence of unsafe abortion	24	38	0
Data available for 2000 or later	39	33	57
Data available for 1995–1999	23	18	29
Data available for before 1995	10	8	12
No data available: estimate from other country or regional average used	4	2	3
Total (%)	100	100	100
Total number (thousands)	132 724	1 454 484	19 700

similar to that for the geographical region or to that of another country with comparable abortion laws, cultural setting and indicators, such as fertility rate, maternity care and percentage urban population.

Table A1.3 shows the availability of data for estimation of unsafe abortion deaths.

Table A1.3 Availability of data for estimation of mortality due to unsafe abortion, 2003

Availability of data	% of maternal deaths	% of deaths due to unsafe abortion	% of all births	% of all women aged 15-44 years
Abortion legal and no evidence of unsafe abortion	3	0	24	38
Data available	80	84	67	57
No data available: estimate based on regional average	17	16	9	4
No mortality estimate (maternal mortality not available)	n.a.	included in row above	0.1	0.1
Total (%)	100	100	100	100

Mortality data were available for 101 countries with evidence of unsafe abortion, covering 80% of maternal deaths, 84% of unsafe abortion deaths, 67% of global births, and 57% of women aged 15–44 years. Globally, only 3% of maternal deaths occur in countries where abortion is legal and there is no evidence of unsafe abortion (and therefore no unsafe abortion deaths); this corresponds to 24% of births and 38% of women aged 15–44 years. A further 33 countries, accounting for 9% of births and 4% of women, had no data on unsafe abortion mortality, and were assumed to have the regional average for unsafe abortion-related proportion of maternal deaths; these countries accounted for another 17% of maternal deaths and 16% of deaths due to unsafe abortion. Among the countries for which information was available, 26 allow abortion on broad grounds; nevertheless, unsafe abortions still occur outside the legal framework, because of the cost of legal abortion and social reasons. For those countries, we estimated the number of deaths due to legal or spontaneous abortion, and subtracted this from the total reported number of abortion deaths. Countries with both legal and unsafe abortions contributed only small numbers of deaths from unsafe abortion, except India, where large numbers of unsafe abortions reportedly take place.

For nine small countries (accounting for 0.1% of births and of women) no estimates of maternal mortality were available and abortion mortality could thus not be estimated; they were assigned the estimate of the subregion.

Most data on abortion deaths were reported by governments (56), in many cases for WHO's mortality database; 16 reports were reproductive age mortality studies (RAMOS), confidential enquiries or community studies, usually at the national level; 13 were national hospital data or weighted averages from a number of sites; 2 were national estimates; 14 came from a single hospital.

4. Estimating incidence of unsafe abortion

4.1 Methods and assumptions

The incidence of unsafe abortion was first calculated for each country using the abortion rate or ratio. The estimates of unsafe abortion incidence for subregions and for the world were derived from the estimates for countries with a population of 100 000 or more, weighted according to the number of women aged 15–44 years and the number of births for the year 2003, as estimated by the United Nations Population Division.[34] Because of the level of uncertainty, country estimates were used solely for the purpose of aggregation and are not published.

The most pertinent assumptions underlying the use of the reported data are:

- the prevalence of induced abortion will increase or decrease only as other determinants of fertility change, mainly total fertility rate and effective contraceptive use;[35]
- a change in law (*de jure*) or practice (*de facto*) to make abortion available on more liberal grounds or on request will lead to a shift from clandestine to legal abortion as the infrastructure becomes available;
- to circumvent the problem of induced abortion being misreported as spontaneous the combined incidence of spontaneous and induced abortion was used, when available, corrected for the incidence of spontaneous abortion using the methodology described below;[36]
- subnational data can be generalized to country level with adjustments;
- unsafe abortion ratios are lower in rural than in urban areas.[37, 19, 38] Incidence in rural areas was assumed to be 60% of that in urban areas,[39,40] unless otherwise indicated.[41]

4.2 Country estimates

Hospital data

Unsafe abortion incidence was estimated from hospital data by adjusting for spontaneous abortion (see below). The abortion/birth ratio was further adjusted on the assumption that not all unsafe induced abortions lead to complications that require hospitalization, the adjustment depending on the methods commonly used for unsafe abortion and their associated risk of complications. Where data were not available for the national level, the abortion/birth ratio was also corrected for a lower abortion ratio in rural areas, as indicated above. The ratio was finally converted into the corresponding abortion rate (using UN estimates of live births and numbers of women aged 15–44 years for the year of the survey).

For example, using urban hospital data, the ratio was estimated as:

$$F * [(A - S) * U] + [(A - S) * P * R)]$$

where:

F is an adjustment factor generally between 3 and 7,[28,29,30,36] to allow for the fact that not all unsafe induced abortions require hospitalization;

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A is the abortion ratio found in the hospital studies;

S is the correction for spontaneous abortion (see below);

U is the percentage of population living in urban areas ;

P is the assumed proportion of rural to urban hospital abortion ratios;

R is the percentage of population living in rural areas.

Adjustment for spontaneous abortion

Following the procedure suggested by Singh & Wulf, the abortion/birth ratio was adjusted by 3.4% (estimated using a life-table approach) to account for the expected proportion of spontaneous abortions 36 at 13–22 weeks' gestation. It is assumed that the proportion of women with spontaneous abortion who are hospitalized is approximately equal to the proportion of women giving birth who deliver in a hospital in a given country.

Community studies

Community studies may relate abortion to births, or report the percentage of women of reproductive age who have had an induced unsafe abortion in the previous year or ever. Rates of women who had ever aborted were converted into yearly rates using the formula:

$$W_{rep.age} * Av_{abo} / Av_{rep.yr}$$

where:

$W_{rep.age}$ is the percentage of women reporting ever having had an abortion;

Av_{abo} is the reported average number of abortions per woman;

$Av_{rep.yr}$ is the average number of reproductive years, which is assumed to be 15 for women in the age range 15–44 years unless indicated otherwise.

Yearly abortion rates were corrected for 50% under-reporting, [42,43,44] or as indicated in the study[45,46,47] and adjusted for spontaneous abortions, as follows:

$$C * A - S$$

C is the correction factor for under-reporting;

A is the abortion ratio found in the study;

S is the correction for spontaneous abortion (see above).

Reported national estimates

For a few countries, national estimates of abortion incidence or number of abortions were available. The number of abortions was related to the number of women aged 15–44 years, as estimated by the UN, to arrive at the abortion rate.

Countries with no data

A few countries, corresponding to 4% of births, for which no information was available (see Table 1), were assumed to have the same abortion rate as other countries in the region or as other countries with similar abortion laws, fertility and contraceptive use.

5. Estimating mortality due to unsafe abortion

5.1 Methods and assumptions

The percentage of maternal deaths due to unsafe abortion was first estimated for each country as detailed below. The estimates of unsafe-abortion-related maternal mortality for subregions and the world were derived from the estimates made for countries with a population of 100 000 or more, weighted by the number of maternal deaths (using country-specific WHO maternal mortality ratios and UN birth estimates for 2003 [32,33,22]). Framing unsafe abortion mortality within the overall maternal mortality takes account of the prevailing misreporting and under-reporting of maternal deaths, assuming that abortion deaths are equally undercounted; however, because of the stigma attached to abortion, the under-reporting could be higher.

For every country, data were carefully reviewed in the light of

- the existing abortion law (*de jure*) and its application (*de facto*);
- the estimated incidence of unsafe abortion;
- the percentage of deliveries taking place in hospital;
- the commonly used unsafe abortion methods.

The two most pertinent assumptions underlying the use of the reported data are that

- abortion-related mortality occurs mainly or exclusively as a result of unsafe abortion;
- subnational data can be generalized to country level with appropriate adjustments.

5.2 Country estimates

Estimates of the proportion of maternal deaths due to unsafe abortion originated from three sources: national statistics, community studies and hospitals. The assumptions and formulas applied for each are outlined below.

National reports

National statistics and reported figures have been used without adjustment. However, for countries where legal abortions also take place, mortality data were adjusted, assuming a case-fatality for legal abortions of 3 or 6 per 100 000 procedures, i.e. 5 or 10 times higher than that in the USA, according to the general level of care in the country.

Community studies and reproductive age mortality studies

Community studies, reproductive age mortality studies (RAMOS) and confidential enquiries have been assumed to provide the best estimates, when done at the national level or covering both rural and urban areas, and have been applied without adjustment.

A few subnational studies were available. Using the assumption that mortality in rural areas is 0.7 that found in urban areas, the calculation applied in the case of urban data was:

$$(M_u * U) + (P_{rcs} * M_u * R)$$

M_u is the survey-based abortion-related mortality in urban areas as a percentage of maternal mortality;

P_{rcs} is the assumed proportion of rural mortality to urban community study mortality;

U is the percentage of the population living in urban areas;

R is the percentage of the population living in rural areas.

Hospital data

When national hospital data were available, they were applied without adjustment. If data were available from a number of hospitals, they were weighted by maternal deaths to arrive at a national estimate. However, unsafe-abortion-related deaths appear to account for a higher proportion of maternal deaths in referral or central hospitals than at the national level. It was therefore assumed that, nationally, the proportion of maternal mortality related to abortion was 0.9 of the proportion seen in referral hospitals. The calculation applied was then:

$$P_N * H_m$$

where

P_N is the proportion applied (here 0.9);

H_m is the abortion-related mortality as a percentage of maternal mortality, based on hospital data.

Where only urban data were available, extending the above reasoning, it was assumed that the abortion-related maternal mortality in urban areas was 0.9 of that seen in the urban referral hospitals, while that in rural areas was 0.6 of that seen in the urban hospitals.[48] The rural mortality was expected to be lower than the urban, because the incidence of abortion was expected to be lower (see above), even though the risk of death may be higher because access to health care facilities is less easy in rural areas. The calculation applied in the case of urban hospital data was then:

$$(P_{hu} * H_u * U) + (P_{hr} * H_u * R)$$

where

P_{hu} is the assumed proportion of urban mortality to urban hospital mortality;

H_u is the abortion-related mortality as a percentage of maternal mortality in urban hospitals;

P_{hr} is the assumed proportion of rural mortality to urban hospital mortality;

U is the percentage of the population living in urban areas;

R is the percentage of the population living in rural areas.

Countries with no data

A few countries, for which no information was available, were assumed to have the same percentage of abortion-related maternal mortality as other countries in the region or as other countries with similar abortion laws, total fertility rate, unsafe abortion incidence, and percentage hospital deliveries.

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Annex 2

Countries and territories[a] grouped according to the United Nations classification of regions

A2.1 United Nations country listing by level of development

Developed regions

Northern America, Europe, Japan, Australia and New Zealand

Developing regions

Africa, Americas (excluding Canada and United States of America), Asia (excluding Japan), and Oceania (excluding Australia and New Zealand)

Least developed countries

Africa

Angola, Benin, Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia

Asia

Afghanistan, Bangladesh, Bhutan, Cambodia, Democratic Republic of Timor-Leste, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Yemen

Caribbean

Haiti

Oceania

Samoa, Solomon Islands, Vanuatu

[a] With more than 100,000 inhabitants.

A2.2 United Nations country listing by geographical region

Africa

Eastern Africa

Burundi
Comoros
Djibouti
Eritrea
Ethiopia
Kenya
Madagascar
Malawi
Mauritius
Mozambique
Réunion
Rwanda
Somalia
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Middle Africa

Angola
Cameroon
Central African Republic
Chad
Congo
Democratic Republic of the Congo
Equatorial Guinea
Gabon
Sao Tome and Principe

Northern Africa

Algeria
Egypt
Libyan Arab Jamahiriya
Morocco
Sudan
Tunisia
Western Sahara

Southern Africa

Botswana
Lesotho
Namibia
South Africa
Swaziland

Western Africa

Benin
Burkina Faso
Cape Verde
Côte d'Ivoire
Gambia
Ghana
Guinea
Guinea-Bissau
Liberia
Mali
Mauritania
Niger
Nigeria
Senegal
Sierra Leone
Togo

Asia

Eastern Asia

China
Hong Kong Special Administrative Region of China
Macao Special Administrative Region of China
Democratic People's Republic of Korea
Japan
Mongolia
Republic of Korea

South-central Asia

Afghanistan
Bangladesh
Bhutan
India
Iran (Islamic Republic of)
Kazakhstan
Kyrgyzstan
Maldives
Nepal
Pakistan
Sri Lanka
Tajikistan
Turkmenistan
Uzbekistan

South-eastern Asia

Brunei Darussalam
Cambodia
Democratic Republic of Timor-Leste
Indonesia
Lao People's Democratic Republic
Malaysia
Myanmar
Philippines
Singapore
Thailand
Viet Nam

Western Asia

Armenia
Azerbaijan
Bahrain
Cyprus
Georgia
Iraq
Israel
Jordan
Kuwait
Lebanon
Occupied Palestinian Territory
Oman
Qatar
Saudi Arabia
Syrian Arab Republic
Turkey
United Arab Emirates
Yemen

Europe

Eastern Europe

Belarus
Bulgaria
Czech Republic
Hungary
Poland
Republic of Moldova
Romania
Russian Federation
Slovakia
Ukraine

Northern Europe

Channel Islands
Denmark
Estonia
Finland
Iceland
Ireland
Latvia
Lithuania
Norway
Sweden
United Kingdom

Southern Europe

Albania
Bosnia and Herzegovina
Croatia
Greece
Italy
Malta
Portugal
Serbia and Montenegro
Slovenia
Spain
The Former Yugoslav Republic of Macedonia

Western Europe

Austria
Belgium
France
Germany
Luxembourg
Netherlands
Switzerland

Latin America and the Caribbean

Caribbean

Bahamas
Barbados
Cuba
Dominica
Dominican Republic
Guadeloupe
Haiti
Jamaica
Martinique
Netherlands Antilles
Puerto Rico
Saint Lucia
Saint Vincent and the Grenadines
Trinidad and Tobago
United States Virgin Islands

Central America

Belize
Costa Rica
El Salvador
Guatemala
Honduras
Mexico
Nicaragua
Panama

South America

Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador
French Guiana
Guyana
Paraguay
Peru
Suriname
Uruguay
Venezuela

Northern America

Canada
United States of America

Oceania

Australia and New Zealand

Australia
New Zealand

Melanesia

Fiji
New Caledonia
Papua New Guinea
Solomon Islands
Vanuatu

Micronesia

Guam
Micronesia (Federated States of)

Polynesia

French Polynesia
Samoa
Tonga

Annex 3

Table A3.1 Estimates of the incidence of unsafe abortion and associated mortality, by WHO region, 2003

	Unsafe abortion			Mortality due to unsafe abortion		
	Number (rounded) [a]	Incidence rate (per 1000 women aged 15–44 years)	Incidence ratio (to 100 live births)	Number of deaths (rounded)[a]	% of all maternal deaths	Mortality ratio (to 100 000 live births) (rounded) *
All Member States	19 700 000	14	15	66 500	13	50
African Region	4 600 000	30	17	34 100	14	120
Region of the Americas	3 900 000	20	24	2 000	11	10
Eastern Mediterranean Region	2 800 000	24	19	7 800	12	50
European Region	500 000	3	5	100	4	1
South-east Asia Region	7 200 000	19	19	21 800	13	60
Western Pacific Region	700 000	2	3	700	4	3

[a] Figures may not add up to totals because of rounding.

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